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Combat Crew

strategic air command

MARCH 1987

★★★★

STRIVE FOR EXCELLENCE

Lieutenant General Kenneth L. Peek, Jr.
Vice Commander in Chief
Strategic Air Command

This is a very dynamic and challenging time for SAC. The deployment of new weapon systems such as B-1B, KC-10, and Peacekeeper, the modernization of existing forces, and the development of new mission capabilities have created a multitude of opportunities. At the same time, fiscal constraints imposed by our national resolve to balance the federal budget have driven a variety of assignment policy changes and reoriented our thinking about when and why we move people. These changes have created uncertainties for our most valuable resource—you, our SAC people. In this article, I'd like to give you my perspective on what you should expect and what you can do to enhance your personal career development in SAC today.

In general, you can expect that there will be fewer PCS moves. The likelihood of moving from one wing in the CONUS to another wing in the CONUS and not substantially changing jobs is very small. You must prepare yourself for positions of greater responsibility and make yourself attractive enough professionally so that it makes good sense to spend the money and move **you** PCS instead of someone else. The bulk of the moves you'll be seeing for the foreseeable future will occur when someone goes to a CCTS, one of our new weapon systems, a headquarters, PME, AFIT, ATC instructor duty, or other special duties such as ASTRA.

In your current assignment you need to take advantage of every opportunity to grow professionally. Upgrade in your crew specialty, to instructor if possible. If you are already an instructor look for opportunities in Training Flight, the Standardization and Evaluation Division, and elsewhere on the wing staff. Don't be in too big a hurry to leave your major weapon system for headquarters or career broadening duties. It's important that you have sound credentials in your major weapon system, because if you lack them you may find some opportunities foreclosed, or at least more difficult to come by, in the years ahead. My advice to all young crew members is to become the expert in your crew specialty, know your tech order and associated directives thoroughly, and learn all you can about your primary duties. Airmanship and missileer vigilance are the most valuable traits you can develop at this stage of your career. Solid duty performance is the key that will open the most doors for you.

While solid duty performance is essential to your personal and professional development, there are other factors which are also very important. Remember, the Air Force promotes officers, not missileers or aviators, and our promotion system operates on a best qualified basis. Even if you are fully qualified for promotion, a board of senior officers must compare your records with those of your contemporaries and select only those officers who appear best qualified to assume increased grade and responsibility. Much the same ocurs when you are considered for assignment to a selectively manned job. To be fully competitive, you need to complete the appropriate level of PME and earn a master's degree if possible. This is in addition to maintaining the highest level of duty performance. Right now is the time to build your professional credentials.

So what does all of this mean? Well, as I said at the beginning of this article, this is a very opportune and challenging time for those of us in SAC. New and modernized weapon systems, new capabilities, substantial modifications of assignment policies, and other changes have altered career patterns and highlighted the importance of personal career development. Despite these changes, the bottom line in SAC remains the same—COMBAT CAPABILITY. No matter what else may change, the only reason you and I are where we are is to make sure SAC has the capability to deter war, and should war come, to win. Strive for excellence in your primary duty and in your professional development. You will make an important contribution to SAC's combat capability while preparing yourself for future opportunities.★★★

Combat Crew

Magazine of the Strategic Air Command — 37th Year of Publication

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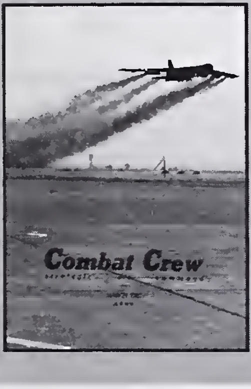

ON THE COVER

Is your crew combat-ready? Or have you become a creature of habit? SAC combat crews, like the one flying this B-52G, must be prepared for the unexpected. See pages 4 and 16 for articles concerning these two relevant topics.

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COMBAT CREW is an internal publication of the Strategic Air Command with the primary purpose of promoting safety. The contents of this magazine are informative and not to be considered as directive in nature. Facts, testimony and conclusions of all mishaps herein may not be construed as incrimination under Article 31 of the Uniform Code of Military Justice. All names, dates and places used in conjunction with mishap stories are fictitious. Written permission must be obtained from Headquarters, Strategic Air Command before any material may be reprinted by other than U.S. Air Force organizations. Use of funds for printing this publication has been approved by Hq. USAF, Distribution FX, controlled by IGFE, SAC units submit distribution requests through local PDO. Reader to copy ratio one per combat crew; 10:1 for other SAC personnel. For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

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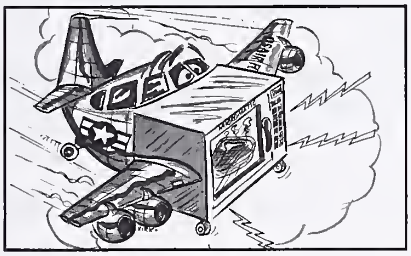

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Creatures of Habit

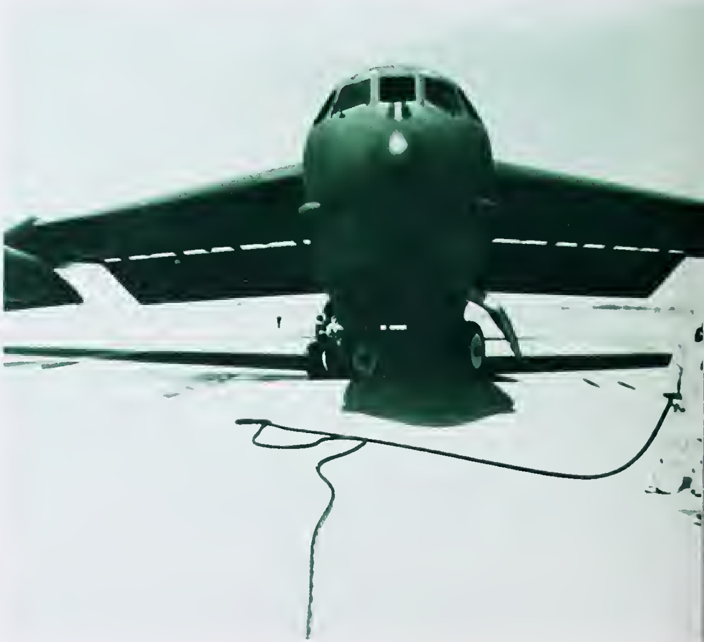
Lt Mike Morrison
453 FTS, Mather AFB

It started out as a routine B-52G training sortie from Mather AFB, California. After takeoff, air refueling, and low level in IR300, we proceeded to an area off the coast of Northern California to conduct a live fireout of the gunnery system and a flare drop exercise. The flare dispenser system had been completely loaded with flares instead of the normal 32 flares used in training missions because ECM maintenance had reported unreliability in some of the dispensers. During the flare drop exercise, the system seemed to work as advertised, although it had been impossible to see any flares being dispensed in the glare caused by reflected sunlight by a cloud deck beneath the aircraft. The gunnery exercise went without a hitch.

Our aircraft had been scheduled for a cold seat swap, so we were asked to withhold deployment of the drag chute if possible. We had been scheduled to land on the first approach, but we were unable to do this because the aircraft exceeded the 270,000 pound maximum weight for non-drag chute landings. The second time around, the aircraft gross weight was 267,000 pounds with a best flare plus ten of 146 knots. For runway 22 left, with winds of 180/10, crosswind crab was computed and set at three degrees left.

Our copilot would probably be the first to tell you that things always go wrong when they are least expected. As a pilot upgrade, he was sitting in the left seat, and this was to be his last flight before departing for Castle AFB for CCTS. Our flight was to be no exception to Murphy's Law. It was Monday afternoon, and the crew had spent the weekend generating. We were all looking forward to a fairly early landing and a long, relaxing evening. Guess again! After a very slight nosegear landing at 120 knots, the aircraft skipped for what seemed to be

The right front truck was pointed about 35 degrees to the right, while the left front truck was pointed somewhat to the right.



It was amazing that the aircraft had stayed on the runway.

an unusually long time before coming back to the runway. Immediately after settling onto the pavement, there were two loud bangs that seemed to come from under the aircraft. The plane began to veer to the right, and at this time, the IP, who was in the right seat, took control of the aircraft. He deployed the chute at 110 knots, and wisely elected to withhold use of the brakes until the aircraft had slowed considerably. Shortly after he announced to the crew that it was nothing more than a blown tire, the aircraft began to vibrate violently, and became even more difficult to control. We could hear sheet metal grinding along the runway.

About this time, tower announced that we had a fire in the forward wheel well. Tower's call and the smell of burning rubber now filling the cockpit certainly had our attention. At this time, we were doing about 50 knots, and the IP decided to begin using brakes judiciously in order to slow the aircraft.

The two defensive team members, the gunner and myself, were readying our areas for an emergency ground egress. Neither of us particularly wanted to try to climb through the crew entry hatch past a burning tire, and climbing down an escape rope past the forward wheel wasn't an inviting thought either, but we partially extended our escape ropes anyway in the event that there was some trouble exiting through the pilots windows. The areas around the seats were cleared and we both fastened our oxygen masks, pinned our seats, and unstrapped. Downstairs, the offensive team had cleared the crew entry hatch and unlocked it.

The aircraft was still rolling when the SOF caught up with us on the runway and informed us that if there had been a fire, it was out now, and that all he could see was a little smoke coming from the front trucks. He further informed us that both of our front right tires had blown, and that we were leaking hydraulic fluid. Once the plane had stopped, the gunner opened the hatch and exited, quickly followed by the radar navigator, navigator, and myself, the EW. The pilots remained on board just long enough to complete emergency engine shutdown.

There was very hot hydraulic fluid all over the front end of the aircraft, and what was left of the tires on the front right truck was smoking profusely. The right front truck was pointed about 35 degrees to the right, while the left front truck was pointed somewhat to the right due to crosswind crab. It was amazing that the aircraft had stayed on the runway. The front right main door had collapsed and was now supporting some of the aircraft weight. There were numerous dents and wrinkles in the aircraft skin around the door, as well as a small hole immediately above the door.

In no time at all, fire coverage was on the scene followed by the DO, Wing Vice Commander, OMS, and Safety. Before maintenance began trying to replace the tires in order to tow the lame bird off the runway, the gunner and I decided to check the flares and guns. The aircraft was still intact for the most part, and it would be a shame to drop a flare into the hydraulic fluid and burn it up now. Besides, most of my flight lunch was still onboard the aircraft and retrieving the flare streamer, DTUCS, and Comm kit was just the excuse that I needed to go get it. As it turned out, all the flares had been expended and the guns were safe.

If you ever have the opportunity to be involved in any kind of aircraft mishap, there are several things that the safety office is going to want from you. They will want a statement about what happened; a complete history of everything you've eaten and done for the past 72 hours; and they will want some of your precious bodily fluids. That's right — not only will they want two urine samples, they will also want six vials of blood.

The exact cause of our incident has not yet been determined, but it now appears that the problem may lie with a relay in the anti-skid system. If this was the cause, then it appears that it may have faulted, causing the brakes on the number three and four tires to lock up prior to touchdown. The resulting stress would have blown the tires and also torqued the wheels to the right, effectively allowing them free travel. This did not enhance the road handling characteristics of the aircraft at all.

The incident was officially listed as a Class C mishap, but it easily could have evolved into a Class A mishap had the IP not been thinking.

We learned several things from this experience. First, the pilots were able to keep the aircraft on the runway using only the rudder. Aircraft steering was nearly useless. The drag chute, not the brakes, was used as the primary means of slowing the aircraft. Had brakes been used, the aircraft almost certainly would have departed the runway. Second, don't delay departing the aircraft for any reason. Even though I was in the best position to leave the aircraft first, I was the fourth crew member off the aircraft because I instinctively grabbed the communications kit and attempted to leave with it—valuable seconds wasted.

In conclusion, remember that accidents can happen at any time, and that they always happen when you least expect them. If you expect them, you can prevent them. When the unexpected does happen, don't allow yourself to become a creature of habit like I did—Think!

"ALGA 67, BREAKAWAY!"

Lt Col Kyle W. Rensler
912 AREFS, Robins AFB

When one of our line aircraft commanders was unable to fly, I was the staff pilot tabbed to take his place. Actually, I was looking forward to the mission: an early evening air refueling against a "heavy" receiver on a track not too far from the home drome. Our unit is converting to the KC-135R and this was a good chance to fly the entire sortie in the seat.

At base operations, we discovered that the track would probably be unusable due to thunderstorms. However, if we could refuel from the ARIP to the ARCP, it looked as if we would be in the clear and able to complete the mission. No other tracks in the area were available and this looked like our best shot. We contacted the receiver's command post and they advised us that while the weather was not too promising, their crew was already airborne and planned to be at the rendezvous on time.

As soon as we lifted off, we could see the thunderstorms in the distance. We were well over 100 miles away from the weather, in the clear, and could see the lights of other aircraft all over the sky as they attempted to divert around the CBs. Our route of flight to the ARCP kept us well clear with no possibility of weather closing in behind us.

Approaching our orbit point, our navigator noted that a better alternative to refueling between the ARIP and the ARCP would be to set up a random east-west track hinging on the CP. Another tanker in the area had just completed this type of refueling and the controlling ARTCC quickly approved our request. We were in contact with the receiver by this time, so we advised him what we planned to do. Shortly thereafter we completed the rendezvous and the boom operator cleared the receiver to the contact position.

The initial contacts were routine. We completed the offload and made a 180° turn to take the receiver back towards his planned route of flight. The weather was deteriorating somewhat, but the visibility was still adequate, so we continued our air refueling training. We advised the receiver that we would be unable to continue past the ARCP due to the weather. He requested that we continue to refuel as long as possible. No problem, we replied. In order to obtain maximum refueling time we would forego our planned practice emergency separation.

As we neared the termination point, the other aircraft came in for one last contact. I had the autopilot engaged. Previous contacts had been smoothly completed, with the receiver closing and backing out at a rate that did not require me to assist the autopilot in trimming the aircraft. As required, I had one hand on the yoke while my other hand rested on the throttle quadrant.

The initial portion of the closure was again routine. The boom operator advised me as the receiver drew near, "Thirty feet; twenty feet; ten feet. . . ." At this point the routine portion of the flight quickly drew to a close and we entered the "war story" phase. The receiver continued forward through the normal refueling position without stopping.

Our boom operator quickly flew the boom up and to one side while simultaneously giving a "Back ten!" call. The receiver's bow wave pushed the aft portion of our aircraft up and the stabilizer trim wheel commenced a rapid rotation as our autopilot attempted to maintain level flight. I pulled back on the yoke to provide assistance, but by this time we had entered

near zero-G flight and were nosing over toward the path of the receiver. I noticed the altimeter start to unwind.

At this time we arced over and started to descend into the path of the trailing receiver. I thought to myself, "This is not good!" as I reached forward and advanced the throttles. Together with the boom operator and the copilot, I called a breakaway. I leveled off as the receiver backed out and broke off to the right side. The boom operator settled back into his harness and cleared us to climb.

Shortly afterwards we were level at the top of the block with the receiver well clear 2000 feet below. We completed our post refueling report, cleared him to center frequency and proceeded back to base.

End of mission? Not quite. Obviously, our main topic of discussion at the post mission critique was the breakaway. Each one of us had his own story to tell on how it happened and how it looked from each crew position. A quote from a recent Combat Crew article kept running through my mind: "When you least expect it . . . . ."

From a purely practical standpoint, the separation was a success. However, this is in the same school of thought as the old adage, "A good landing is one that you can walk away from." It's been awhile since I received my 2000 hour pin for flying the tanker, and I've practiced more emergency separations than I can remember, but I'll admit that I would not select this particular maneuver to be video taped and presented as the command standard for executing a breakaway.

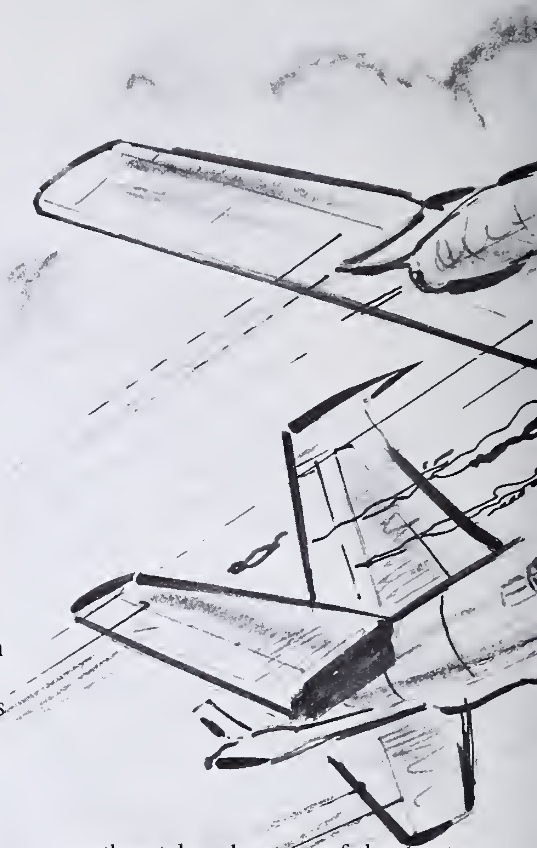
Was I ready to take the proper action? Well, I have certainly been trained, observed, evaluated, and been judged proficient. I've discussed techniques and taught other pilots to perform breakaways in three different models of the −135. But the bottom line is, for a brief moment I was a passenger along for the ride as I allowed the receiver pilot to fly my tanker with the bow wave of his airplane. It was not fun, and darned near ended in disaster.

It's not an experience I intend to repeat, or one I would offer up as something everyone should try. But there's a lesson here. I've discussed it during subsequent mission planning sessions with other crews and with our training flight instructors. I think it's a story that applies to all time-critical situations; engine failure during the takeoff ground run, or at rotation, are two examples that come to mind.

I learned something that evening. Because it happened to me, I'll be just a little more ready, a little bit better prepared, and a little quicker next time; and there will be a next time. It may not be the same situation, but it will be an inflight emergency that I'll have to deal with. When it does happen, I'll sit down afterwards and tell you about it. Will you be able to tell me about your next emergency?

About the author. Lt Col Rensler is the commander, 99 AREFS, Robins AFB. He is a 1968 graduate of OTS and has flown the KC-135A, Q and R Model aircraft at Mather, Kadena and Robins.

Fly the Airplane



Maj Bill Kuerz
CFIC, Castle AFB

"Oh, No!"

THUD!

"I got it."

Power up, high noise level.

"Bozo 25, you have an engine on fire, acknowledge."

"Pilot, boom, fire light on number three."

Number three engine spooling down.

"Generator light."

Copilot's instruments go dim then brighten.

Pilot's panel and engine instruments darken.

Two hydraulic pump inoperative lights illuminate.

"Gear up."

Ever do a 50-flap three-engine climbout? It's a drag. . .I've got to get this thing on the ground. Caution: Engine fire, land as soon as possible.

High drag configuration — flaps 50, pendulum effect of the engines = pitch up, trimmed for a low airspeed = pitch up, coming out of ground effect = pitch up, loss of lift = get the nose up. Let's turn back to land.

Pitch up, bank angle, drag, fire light, generator light, hydraulics, airspeed, drag, flaps, AOA, AOA, AOA, AOA.

Imagine you were there!

We have lost two −135 crews and aircraft during landings or to be more exact, the recovery from landings. The specific blame for the accidents will not be cast. But how can we learn from the mistakes of others? How can the errors be avoided? What happened?

Without flight recorders, we rely on the testimony of witnesses, controllers, pictures, and the magic that crash investigators can surmise from the wreckages. The major differences in these accidents were the experience level of the pilots and the environment in which they were operating. The first was a very experienced instructor on a training mission in day VFR conditions and the second an aircraft commander in night VFR conditions. In both cases, they survived through a short final approach that possibly should have been taken around. The landings were completed though, and a flyable aircraft was brought back into the air. They had the performance capabilities to fly out of the situation. So what happened?

What do you do when confronted with a new situation? Fall back on old habits? Ever been in a hurry to get somewhere? Ever play a ball game and watch one individual try to do everything but really make more errors "doing it all." Distractions cause you to deviate and a hurried individual makes mistakes. A person who is distracted and in a hurry is set up for trouble.

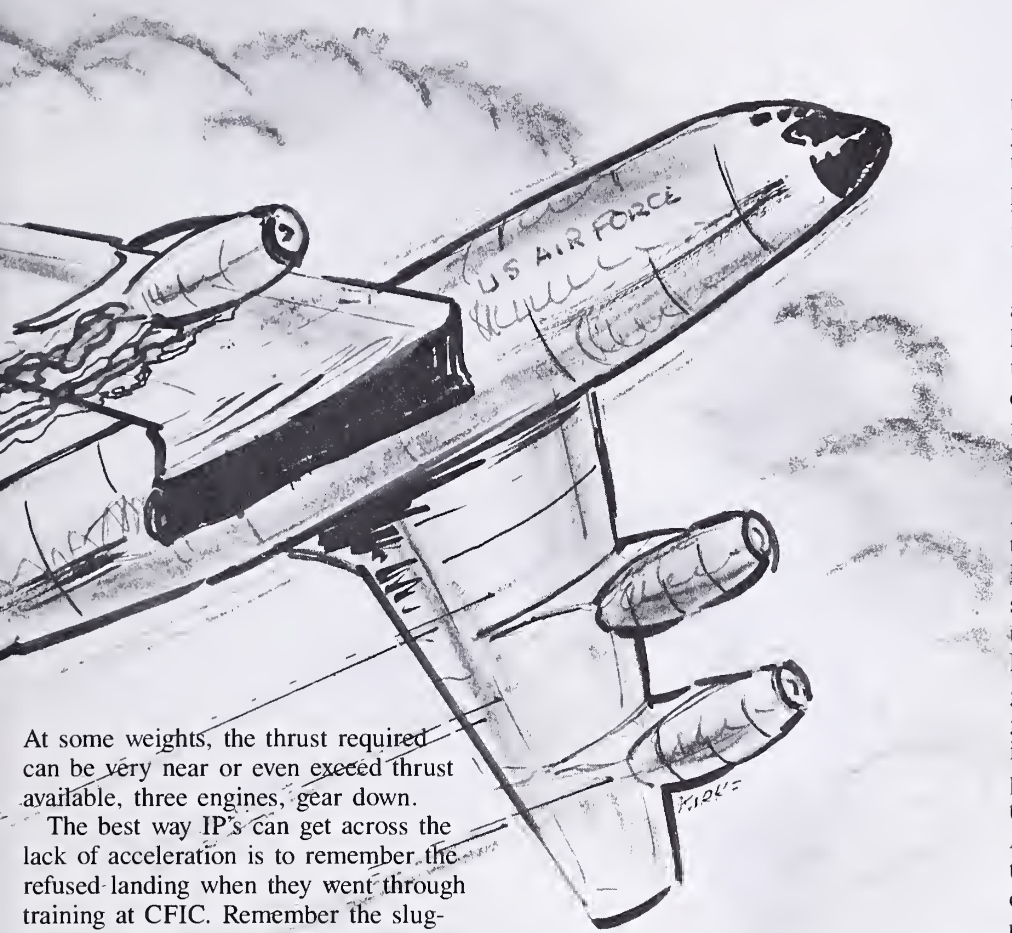
We all should know what to do with a bad approach. In fact, some flying publications say that the results of a landing are 90 - 95 percent due to the approach just flown. In a recent article published in Combat Crew we found out why we drag engine pods but what do we do when we're on the climbout? Let's assume your power is set and probably it is more power than you need. Remember, you just had the hell scared out of you because of a bad landing. The power is up, and so is your pitch.

Watch your pitch! If you are looking for 1000 fpm in a climbout configuration (flaps 20 or 30), it should require no more than 6-7 degrees pitch up.

Airspeed is your pal. If there are no obstacles, what is the hurry to climb? Get airspeed! Many people we see coming through CFIC have a bad habit of letting the pitch get too high. Set the landing attitude and accelerate, terrain permitting! If still in ground effect, you can then take advantage of the greater lift available for a given angle of attack and also the greater thrust available for a given amount of lift required.

Were these accidents too much for one untrained individual to handle? Probably. The simulators do not fly like the airplane, but the situations can be created to simulate what can happen. Can we just talk about a situation to make someone more aware? Without a doubt! We see it time and again, let's hurry to run a checklist or flip switches when the number one priority should be **"Fly the Aircraft."**

Delaying to get the flaps to 30 degrees or being unable to retract the flaps to 30 hampers our acceleration capability. Have you been trained for an engine failure takeoff continued with other than flaps 20 or 30? No! The current SACR 51-135 does not permit us to fly three engine 50 flap go-arounds. Are the acceleration and pitch requirements the same? No! Comparing a three engine to a four engine situation during climbout, our pitch is approximately four degrees less three engine. It takes pilot awareness to alert himself to the new situation rather than falling back on old habits. Old habits can be dangerous. The A-model, in most weight conditions, does not readily accelerate in a flaps 50 configuration.



At some weights, the thrust required can be very near or even exceed thrust available, three engines, gear down.

The best way IP's can get across the lack of acceleration is to remember the refused landing when they went through training at CFIC. Remember the sluggishness of the aircraft at the low airspeed and the necessity to maintain the landing attitude. A pitch higher than the landing attitude is delaying any acceleration capability you may have. The Weapons System Trainer (WST) is particularly effective in getting this point across.

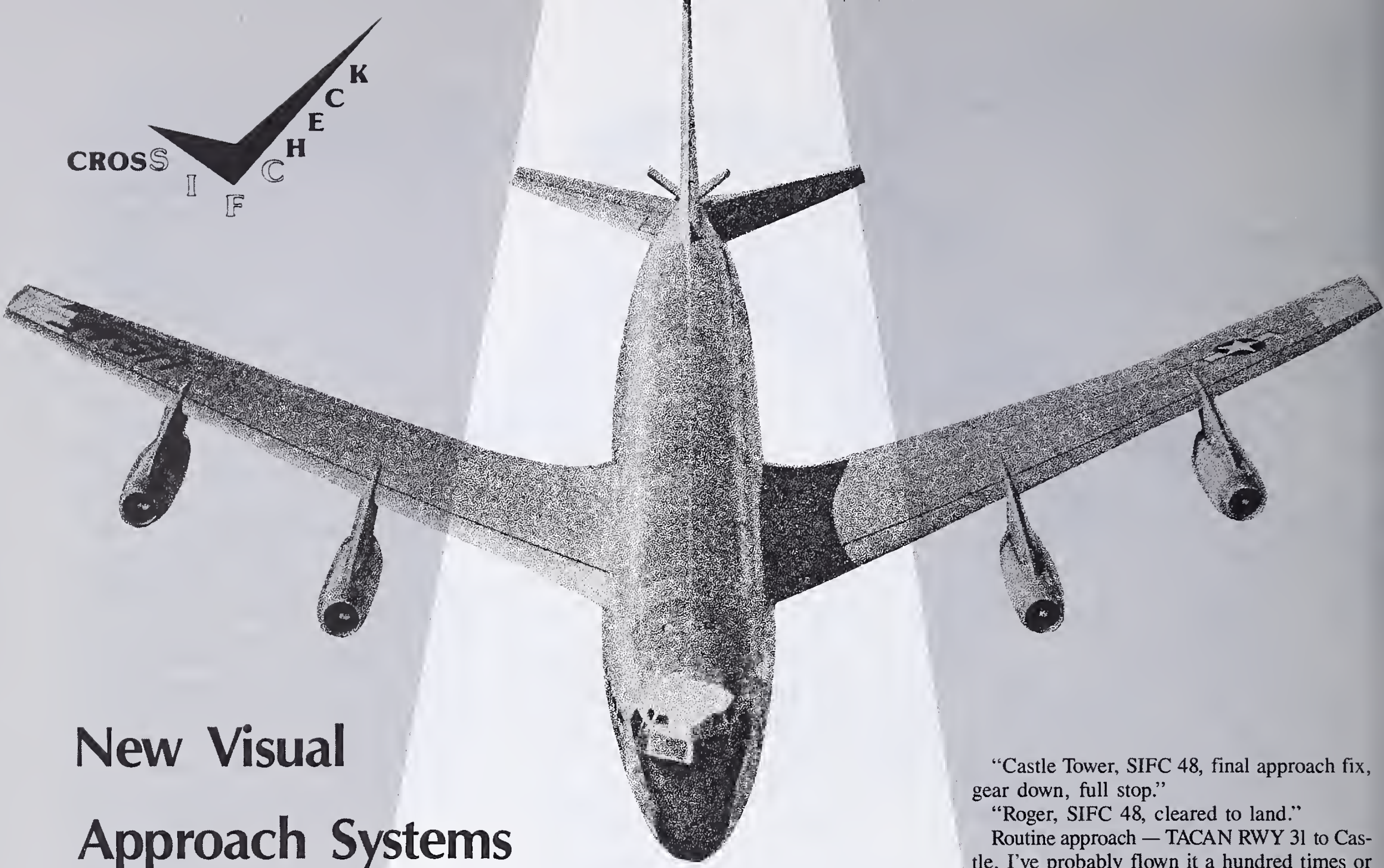
Both aircraft lacked adequate airspeed by the end of the runway and I assume one was due to pitch and the other to a cross control situation. If there was a yawing moment in the second accident, did he apply the amount of rudder he was trained for in response to an outboard engine failure which resulted in a cross control situation and introducing more drag? We teach yaw, roll, deviation from centerline and pilot response time, but the asymmetric situations did not cause the accidents. Flying the aircraft from touchdown through the initial climbout did. Too much pitch and too much control input did, along with distractions and task saturation. One instrument told it all. Not the airspeed indicator and not the attitude indicator, but the AOA. Although it does have its built-in inaccuracies, it is the best overall performance instrument in the cockpit. Learn to cross check it, learn to use it, and learn to live by it. One thing I cannot emphasize enough, the distractions and task saturation that ensued during these accidents cannot be treated lightly. Specifically, losing an engine, generator bus and a hydraulic system would task most IPs to the limit. I must warn aircraft commanders, you had to survive landings on a limited basis in the past, but with the implementation of aircraft commander touch and go's, your possible exposure to the same situation is enhanced. You must in your own mind review what your reactions would be and should be during these incidents.

Some of our "R" model friends may think they have the power to fly out of all situations. Suppose you struck a right outboard engine pod at night, lost the engine and the right hydraulic system on a 50 flap T&G or an aborted full stop? What would your initial reaction be for the go-around? If you pushed four throttles up (remember I'm speaking of reaction, not procedure as you do on three engine missed approaches) what is your inflight minimum control speed? Yours is based on flap position (speed) and asymmetric throttle setting. Where are you then if you are at flaps 50 degrees and flaps 50 touchdown speed and you react by pushing all four throttles up? We don't have the charts to show you but you would not be controllable.

Take a poll in your unit, how many aircraft commanders have ever really had a simple engine failure which led to a three engine landing. Have you ever recovered, seen or talked about recovery from low altitude buffet? Do you know that the pitching tendency will be nose up as you approach a stall? And do you know that after you lower the nose to the horizon and roll wings level that no matter what the flaps are set at, setting the flaps to 30 gives you the best thrust available with the least loss of lift? Do you know to leave the gear where it is because if you raise the gear, there will be a momentary drag increase due to the gear doors? Is a pilot expecting too much of himself in these situations other than "Flying the Aircraft?" In the simulator, are we teaching to hurriedly react to an emergency so the next one can be presented? Is this the habit pattern we want to develop? Is it in your habit pattern (pilots, navs, and booms) to cross check the AOA? Let's not be so naive to think the use of cautions and warnings are the ultimate answer. Let's not look for a new procedure as a result of these accidents. A better answer is exposure and meaningful training. **Fly smart. Fly safe.**

About the author. Maj William F. Kuerz is a CFIC IP with over 3000 hours in the KC-135. He has been stationed at Grand Forks AFB and Mather AFB where he worked in scheduling and later was named Chief of the KC-135 section in Stan/Eval.

CROSS SIFC CHECK



New Visual Approach Systems Will Get Your Attention

Lt Col John Vogt
SIFC, Castle AFB

"Castle Tower, SIFC 48, final approach fix, gear down, full stop."

"Roger, SIFC 48, cleared to land."

Routine approach — TACAN RWY 31 to Castle. I've probably flown it a hundred times or more during training at Castle — copilot training, RTU (remember that?), pilot upgrade, CFIC, CCTS instructor. Today though, there is

FIGURE 1.

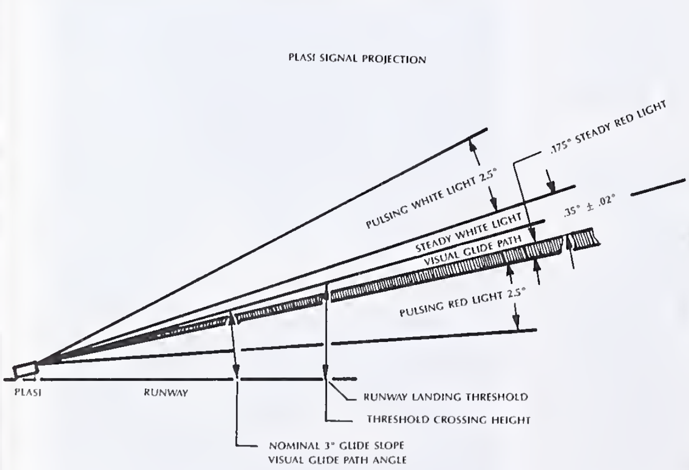
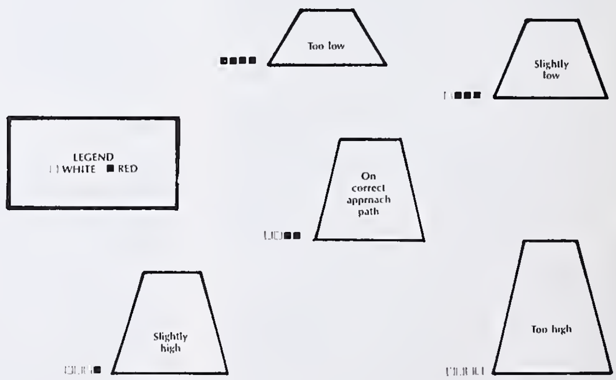


FIGURE 2.



a little more excitement than usual while flying this approach. I get to try something new! I can't wait to get to the VDP to look outside. In a moment we're there. I look outside for the runway environment, reduce power and push the nose over to establish a three degree visual glidepath. Immediately I see what I've been waiting for — on the right side of the runway — a single, steady white light telling me I'm on the correct glidepath. I'll follow the steady white light down to the flare for landing.

SIFC is evaluating a new visual approach system at Castle AFB called PLASI (Pulse Light Approach Slope Indicator). Why PLASI? What happened to my VASI (Visual Approach Slope Indicator) lights? VASI's have been successfully guiding pilots to approach completion for a long time. The problem now is that VASI (and spare parts) are no longer in production, making it difficult to repair the system. Realizing this, the Air Force tested several visual approach aids in late 1983 and early 1984 at Williams AFB, AZ, hoping to find a VASI replacement.

Two new systems, PLASI and PAPI (Precision Approach Path Indicator), were tested exhaustively. During this side-by-side testing of the PLASI, PAPI and VASI, the PLASI and PAPI were found to be equivalent in providing accurate visual glidepath information and both were found to be superior to VASI. In approving these two new systems for Air Force use, the Air Force has decided to leave the choice of which system to use (when the VASI's are no longer repairable) to the individual commands or bases.

Let's take a look at both systems and see what visual cues we can expect to receive. The PLASI system is usually on the left side of the runway near the touchdown zone (we couldn't do this at Castle because of interference with the high speed taxiway), and is placed to coincide with the precision runway point of intercept (RPI). The system is a single, self-contained unit that provides vertical glidepath information (same as VASI) plus a rate of change of deviation from the correct glidepath (VASI does not do this). All you get from VASI is an on glidepath (red over white), high (white over white) or low (red over red) indication with subtle changes in between. The PLASI, on the other hand, gives you glidepath information plus how far above or below the glidepath you are and how fast you are deviating from the glidepath. An on glidepath indication is a steady white light that is 0.35 degrees plus or minus 0.02 degrees wide (See figure 1). As you get higher on glidepath, the white light begins to pulsate — the faster the pulse, the further you are above the glidepath. The above glidepath indication is 2.5 degrees high. If you are slightly below the glidepath, you will see a steady red light (0.175 degrees wide), and as you get further below the glidepath, the light begins to pulse. The faster the light pulses the lower you are going until you reach the limit of visual contact. The width of the light beam is 16 degrees minimum (8 degrees either side of centerline), as opposed to 20 degrees (10 degrees either side of centerline) for the VASI. Its minimum effective range is at least 4 NM (day or night) and has been seen as far as 15 NM during day VFR conditions. The PLASI has a couple of additional features. The unit will dim automatically at night, has an automatic lamp changer if a lamp burns out, can be turned on and off by remote control, and has a tilt switch that automatically turns the unit off if it is jolted out of glidepath tolerances (earthquake, hard landing, etc.)

Now let's turn our attention to the PAPI (Precision Approach Path Indicator). This system is similar to the VASI, is set perpendicular to the runway, and consists of four separate lights on a horizontal bar. Just like the PLASI, the PAPI is usually located on the left side of the runway near the touchdown zone to coincide with the RPI. The pilot sees all four lights at the same time. The color and combination of the lights determine where you are on glidepath (3 degrees for this example). (See figure 2):

(a) Four white lights — high on glidepath (more than 0.5 degrees above glidepath).

(b) Three white lights, one red (reading from left to right), — slightly high on glidepath (only 0.2 degrees above).

(c) Two white, two red — on glidepath.

(d) One white, three red — slightly low (only 0.2 degrees below).

(e) Four red lights — lower than 0.5 degrees below glidepath.

PAPI has two advantages over VASI. The pilot only has to look at one set of lights (vice two for the VASI) for a quicker interpretation of glidepath information. The pilot can determine more precisely how far above or below glidepath he is. A possible drawback (at least until the pilot gets used to this system) is that he is using a horizontal data presentation to interpret vertical glidepath information.

When these two systems were tested at Williams, both the PLASI and PAPI systems were found to be qualitatively equal to each other and superior to VASI. Also, although equal in quality, 75% of the pilots conducting the testing liked the PLASI best. No one picked the VASI as the best system. So, the bottom line is: Which system is your command/base going to get when the VASI wears out and doesn't work anymore? It depends (a great answer to an instrument question). Money, of course, will play a major role. ICAO has adopted the PAPI system as its standard, resulting in its use at many overseas locations. This may influence events at your base.

The best thing you can do as a pilot is to familiarize yourself with both new systems and be prepared to fly either type. Obviously, once a base has a system installed, the symbol for the system will be indicated in the airfield diagram on the approach plate in your IAP book: V for VASI, P for PAPI, and PL for PLASI. Give us a call at AV 347-4571 if you have any questions.

About the author. Lt Col Vogt is a 3500 hour B-52 IP and is the chief at SIFC. He's also been a flightline instructor and flight commander at Castle AFB, and has been assigned to Blytheville AFB and Wright-Patterson AFB.

WANTED!

If you have a story to tell, please share it with the rest of us. A recent reader survey indicated that our most popular articles are of the "There I was . . ." variety. Who knows, that hair raising incident that you skated through recently may trigger our thoughts and keep us from being involved in a similar situation. If you feel threatened about "owning up" to some less than smart move on your part, send along your experience anyway -- unsigned. Some of our most thought provoking articles have been written by a crew member named A-Non-E-Mouse. Procedures for submitting articles are found on page 7 of AFR 127-2 SAC Sup 1, but if you have further questions or would like to discuss an idea for an article, feel free to call us at AV 271-2620.

A-NON-E-MOUSE

SAC TACTICS SCHOOL
IMPROVE THE ODDS

Timing For Cell Formation

Maj David C. Loewer
SAC Tactics School, Nellis AFB

Here's the situation, you're the number three B-52 in cell, it's night, you're flying 350 knots TAS at TA altitude, and you have 51 M-117's loaded. The EW says that there are threats ahead of you and you have the OAS transmitting in TA mode. How are you going to maintain the spacing on number one and two when you can't even see them? Unannounced lead/position changes in the dark could ruin your whole day! The task is cell formation in a hostile environment, not a conventional training sortie on the weekly 60-9.

This situation can occur at almost any time. Maintaining cell spacing in a combat environment will be one of your most challenging tasks. The possibility of a conventional operation must be planned for, regardless of how fervently you hope it never happens. In order to make either a cell or conventional operation a success, you must thoroughly preplan how you are going to fly it. It doesn't just happen, you've got to train for it! Keep in mind that most anyone can be tasked to fly a conventional mission. If you look, you may even find that your unit is already tasked for a conventional OPLAN.

The high altitude cell tactics of Southeast Asia, in which the entire cell maneuvered when under a threat, are quite different than the low altitude tactics of today. In today's environment only one aircraft may maneuver, with the other aircraft continuing on course. Once the maneuver starts, the problem is trying to keep the cell together or reforming the cell without excessive radio communications, beacons or air-to-air TACAN. Some high threat scenarios may not even use the cell tactic because of the difficulty of maintaining cell. The planners will keep you clear of these known high threat areas. Even in avoiding the known threat you will have to get to the target area and unfortunately you just never know when one of the bad guys will jump you. They don't seem to pay attention to their script. If you're tasked with a cell mission, therefore, you'll have to make it work.

TABLE NO. 1

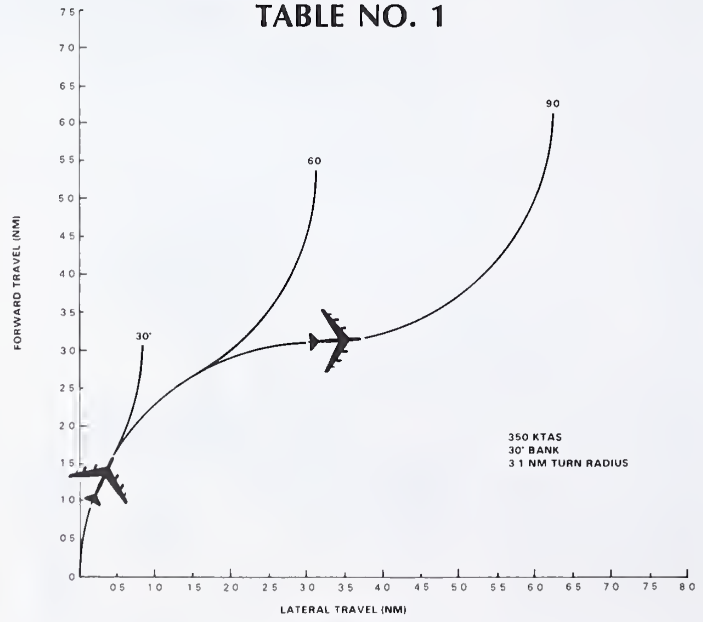


TABLE NO. 2

310 KTAS (523 FT/SEC)

Lateral Travel (NM)	20 Bank			30° Bank		
	S-Turn	ΔT (Sec)	Fwd Travel (NM)	S-Turn	ΔT (Sec)	Fwd Travel (NM)
1/4	15	0 2	1 9	18	0 3	1 5
1/2	21	0 7	2 7	26°	0 9	2 1
3/4	25	1 3	3 3	32	1 7	2 6
1	30	2 0	3 8	37°	2 6	2 9
1 1/4	33	2 8	4 2	42°	3 6	3 3
1 1/2	36	3 7	4 6	46	4 8	3 5
1 3/4	39°	4 7	4 9	50°	6 1	3 7
2	42°	5 8	5 2	54	7 5	3 9
2 1/4	45	7 0	5 4	58	9 0	4 1
2 1/2	48	8 2	5 7	61°	10 7	4 2
2 3/4	50°	9 5	5 9	64	12 5	4 4
3	52	10 9	6 1	67°	14 3	4 5
3 1/4	55	12 4	6 3	71°	16 3	4 6
3 1/2	57°	13 9	6 5	74°	18 5	4 7
3 3/4	59	15 5	6 6	77°	20 7	4 7
4	61	17 2	6 8	80°	23.1	4 8
4 1/4	63	19 0	6 9	83°	25 6	4 8
4 1/2	65	20 8	7 0	86	28 2	4 8
4 3/4	67	22 7	7 1	89°	31 0	4 9
5	69	24 7	7 2			
4 9				90	32 2	4 9
5 1/4	71	26 7	7 3			
5 1/2	73	28 9	7 4			
5 3/4	75	31 1	7 4			
6	77	33 3	7 5			
6 1/4	79	35 7	7 6			
6 1/2	81	38 1	7 6			
6 3/4	83	40 7	7 6			
7	85	43 3	7 7			
7 1/4	87	46 0	7 7			
7 1/2	89	48 7	7 7			
7 7	90	51 0	7 7			

ΔT . . . . . . .Time lost in S-turn

Blocked areas indicate maximum lateral travel available for continuous 90 S-turn

TURN RADIUS 3 85 NM

TURN RADIUS 2 43 NM

Visual separation during daylight VMC conditions has never really been a problem. A number of methods are available, but primarily the pilots' Mark I eyeballs and/or the EVS system are employed. These can be used in both the threat and non-threat environment, depending of course upon the situation. In the non-threat environment numerous electronic means are available to maintain separation: OAS, FCS, and APN-69. However, trying to maintain cell spacing in the conventional warfare arena creates some problems: it probably won't be daylight, or VMC and the pucker factor will be maxed out.

What's left then? Well, with the advent of the OAS you have a system capable of very precise navigation on an order previously unattainable in the B-52. A well developed nav model will have a very small drift rate and will allow you to navigate in a silent mode very accurately. If you can't see lead or two either visually or electronically, you really have only one separation method remaining — timing.

Before you laugh, think about your spacing and the time control capability of the OAS. Spacing requirements could vary from seconds to minutes. However, with a program display and some good basic navigation: DR, air sense (flash from the past!), you can certainly maintain timing. How many of you can control your time to plus or minus 10 seconds with the OAS? Except for those days when you can't even find the airplane, most of you can. The key then is to get on time and stay on time. Without this starting point, there is little chance of completing the mission successfully.

Properly planned timing control points throughout the route will give you the ability to adjust and regain your timing with relative ease. These points should be independent of turn/action points. One caution, don't get wrapped up in all sorts of exotic tables and time control methods and maneuvers. You won't have the time or presence of mind in a combat environment to be referencing books or tables. Keep your timing control points approximately five minutes apart. Timing points can be identified by DOJ, DONB, or the crew. They can be geographic coordinates, radar returns or visual points. The visual points have an added benefit in that they can be used by the pilots to back up the nav team in VMC. Regardless of who picks the points, the crew needs to be actively involved in the planning process. The key is to provide adequate check points to regain timing quickly. Keep in mind that these are very precise timing control points, not fix points or MDPS points. Navigation check points do not need to be changed drastically — remember you're creating additional timing points — points that can be used to regain or confirm your spacing by timing.

TABLE NO. 3

10% METHOD GRAPH
FLIGHT PLAN GS = 300
10% = 30 KNOTS

		Time to Hold Speed Change
seconds to gain or lose	6	1 min
	12	2 min
	18	3 min
	24	4 min
	30	5 min
	36	6 min
	42	7 min
	48	8 min
	54	9 min
	60	10 min

Time control is in itself difficult and will become a real bear when you start maneuvering for threat avoidance. A rule of thumb is that if you are going to maneuver, then speed up, you'll need it. This is painfully obvious when you look at the attached tables No. 1 and No. 2 from the Boeing Service News, Issue No. 337. The maneuvers are a result of a threat situation, so you are probably making maximum rate turns to escape. You can see in the chart that with a heading change of 90 degrees and a 30 degree bank, you have offset yourself 6.2 miles and lost 36.4 seconds. Depending on separation at the start of the maneuver, some serious spacing problems could result. Flying fingertip with number two is not the correct position for lead. Also, forward travel hasn't stopped so you are now 6.2 miles (one minute) closer to your next timing point. Get after the timing problem ASAP — you can't afford to slip this far back into the following aircraft.

In addition to the nav team, insure that the pilots know what the planned groundspeed is and how to maintain it. The easiest method for the pilots to use is the 10% Method out of AFM 51-40 (Table No. 3). Additionally, you need to confirm the position of the other aircraft while maintaining radio silence to the maximum extent possible. One way to do this is by making point calls. For example, as each aircraft passes an action/turn point, a call over HAVE QUICK stating position ("Alpha 1", "Alpha 2") allows confirmation of cell position and the time that each aircraft crosses the specified point. Another way is to simply remain clear of the track until you are back on time. A full maneuver off-course may require a parallel course until original spacing and timing is regained. As a rule of thumb, if you can get to within one-fourth of your planned separation time, you can reenter the track safely. For example, if you are using one minute spacing you would need to get back on time plus or minus 15 seconds in order to reenter the track.

Once the maneuver is complete, return to the use of the OAS and some basic navigation to get back on time and on track. Remember, keep it simple, and don't forget that the machine is merely an aid to your navigation. By using time control and good common sense you can maintain your spacing and position with the end result of bombs on target, on time. There are no guarantees but you can "improve the odds."

About the Author. Maj Loewer is a 1974 graduate of Ohio State University with a BS in Business Administration. He received a Masters in Management from Embry-Riddle Aeronautical University in 1985. An Instructor Radar Navigator in all models of the B-52 aircraft, Maj Loewer is currently assigned to the SAC Tactics School at Nellis AFB.

Microwave La

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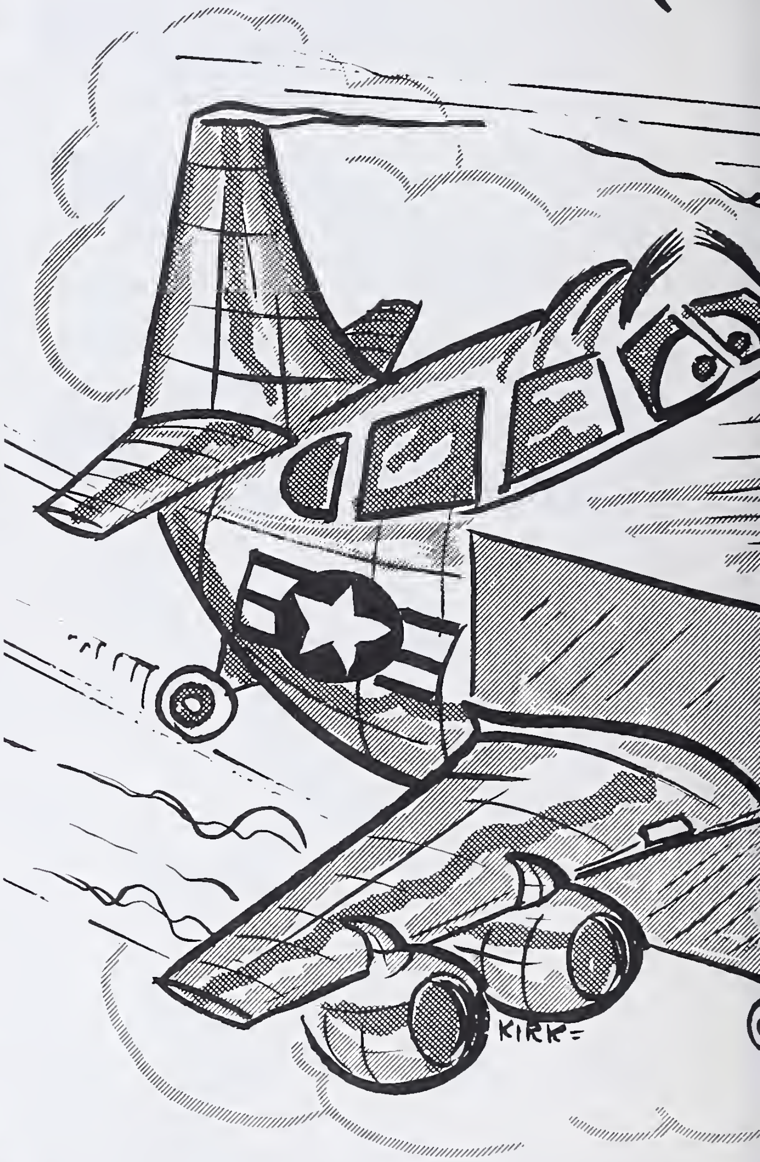

The first thing that pops into my mind when someone says microwave is "What's for dinner?" The microwave landing system, however, reaches far beyond the cabinets and dishware of the modern kitchen. As the replacement for the familiar ILS, it will have greater capabilities and its improved technology will make it the standard approach within the next ten years.

The reasons ILS must be replaced include the following:

ILS is expensive and requires clear areas (i.e., earth and object removal), to avoid signal interference.

ILS is limited in the number of channels it can operate on. This is a major problem in high-density air traffic areas since many airports cannot install an ILS because of the lack of a clear frequency.

ILS signals are subject to reflections from objects such as buildings, standing water and snow.

The ILS course and glidepath signals are narrow and limited.

ILS is not capable of curved, or high-angled approaches, which are an operational necessity at some airports.

Because of these shortcomings, the International Civil Aviation Organization (ICAO) began to search for a worldwide landing system compatible with most aircraft. Several systems were studied to replace the ILS. ICAO reviewed inputs and suggestions from the Federal Aviation Administration, the Department of Defense and The National Aeronautics and Space Administration. A demonstration program was established to gain as much data as possible on the various systems under consideration.

In 1981, the microwave landing system was included in the U.S. National Airspace System. MLS will soon begin to replace the ILS, however, the ILS will remain the primary system for the next ten years.

The advantages of the MLS are multiple:

There are about five times as many channels available with MLS.

Bends, false course and other irregular signals are nonexistent in the MLS.

Azimuth and elevation angles may be selected in the cockpit allowing lower operating minimums at some airports.

MLS accuracy permits autoland operations at all runways.

Other electronic signals are less likely to interfere with the MLS signals.

MLS site preparation and maintenance costs are very low.

Fewer reflection problems and a stronger signal make the MLS a valuable landing system.

By the time the system is complete, 1250 systems will be operational. The installation schedule calls for military as well as civilian procurement. The MLS can be dropped by air and be operational in a very short time — a key advantage to tactical air operations. The first operational military MLS is located at Shemya AFB, Alaska.

Ground components of the MLS are the elevation facility, azimuth facility, and Distance Measuring Equipment (DME). A majority of the designs call for MLS components to be located beyond the departure end of the runway, as well as along the runway.

Initial programs call for straight in segments; however, curved approach segments are not far behind. Advantages include the ability to avoid noise sensitive areas, conflicting approach patterns, and high terrain.

Aircraft proceed through an entry gate, similar to an initial approach fix. Inbound routing would be as desired by approach planners, within airspace and environmental considerations. The signal coverage area of the MLS is a minimum of 40 degrees (maximum 60 degrees) either side

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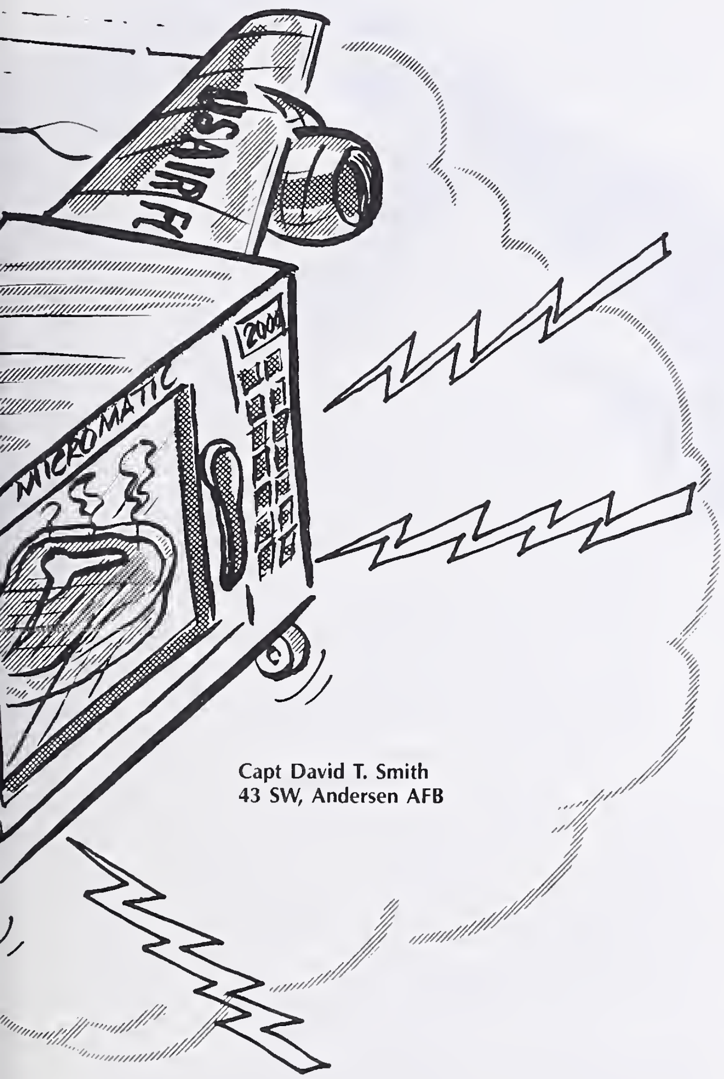


Capt David T. Smith
43 SW, Andersen AFB

of the runway centerline out to 20 NM. The elevation signal is usable to a minimum +15 degrees up to 20,000 feet. The signal patterns of the azimuth and elevation transmitters complement each other, i.e., the azimuth signal is usable up to 20,000 feet.

Three categories of MLS approaches are planned. Category one would be the least restrictive, with category three being the most precise.

A civilian aviation group has proposed the following guidelines for MLS installation and operation:

The MLS transmitter should be in alignment with the final approach course (CAT I and below).

The MLS signal generator should be backed up with a secondary supply (similar to present ILS CAT II and III procedures).

Upon activation of a backup system, an alarm would sound, indicating the switch and alerting controllers.

Pilot (cockpit) equipment must be designed to automatically select correct azimuth and elevation angles.

Azimuth signals and displays should be based on a magnetic heading reference, rather than degrees left or right of a centerline.

An alert system should be installed to alert flight crews of malfunctioning/unreliable signals.

All MLS approaches should have at least a four nautical mile final approach course, and should be constructed around the basics of the present ILS system.

To summarize, the microwave landing system will be a large improvement over the present day ILS. Obstruction-free zones of 1500 feet with the ILS will be gone. There will be no such thing as MLS holdlines — unlike ILS holdlines scattered about taxiways. MLS uses higher frequencies and transmits a multitude of precision approach data, unlike the ILS system. ILS azimuth and elevation signals are different modulations, each being of equal strength on centerline. MLS signals provide many possibilities since the receiver can be adjusted to look for specific (azimuth and/or gradient) signals. The azimuth signals can be compared to the signals from a VOR, but providing precision guidance.

Specific MLS operation involves the azimuth sending a signal within 40 to 60 degrees of runway heading. The signal is sent in a scanning (or sweeping) pattern, with the receiver determining the lateral position. This is done by timing the differences in signal reception. A similar operation takes place in the elevation sector. Cockpit instrumentation will provide for selection of the desired azimuth and/or gradient and give the pilot the aircraft's location (right or left, and/or above and below) the selected parameters. DME will be used extensively with the microwave system, with the marker beacons becoming outdated and useless.

A unique feature of MLS is, with the addition of an onboard computer, the ability to fly "curved" approaches and approaches to runways other than the primary MLS runway. This is possible due to the 60 degree wide signal, resulting in more flexibility and lower operating costs (i.e., one system is cheaper than two). The multitude of holding patterns is another military advantage, since aircraft recovery and turn time could be reduced dramatically.

The MLS sounds like the best system to date. Military fliers will have to be patient and watch for legislation to acquire this new system. The Air Force is currently conducting flight tests with a C-141 military transport, and the future looks bright. The introduction of the MLS age should be welcomed as a positive step in aviation navigation.

About the author. Capt Smith is an aircraft commander with over 1300 hours in B-52s. He also serves as a unit flight safety representative.

Is Your Crew

Combat Ready?

Capt Paul Deckers
410 BMW, K. I. Sawyer

Combat readiness can be defined in many different ways. For an aircrew, one major element of combat readiness is teamwork. Teamwork in the air can be the determining factor as to whether or not the aircrew can get to the targets, deliver the weapons and return home. What follows demonstrates how the most disastrous situations, caused by either systems malfunctions or battle encounters, can be conquered when everyone works together.

On October 29, 1985, at precisely 0900, crew E-34 took off for what was planned as a routine training mission to the Bismarck, ND, low level route. Immediately after gear retraction, or in this case, partial gear retraction, the B-52 developed problems in its navigation equipment. During his equipment check, the EW discovered that nearly half his transmitters were inoperative. Unfortunately for the crew, this was not the end of their problems, merely the foreshadowing of a mission dominated by an array of unusual and potentially life threatening aircraft degradations.

As the pilot team divided the duties of flying the aircraft and taking care of the hung gear, the navigation team repaired the problems at their station and the defense team made several futile attempts to recover lost transmitters. The crew also prepared to meet with an off station tanker for the scheduled air refueling. After just 30 minutes of flight, and a day's worth of problems behind them, the crew initiated the rendezvous. The air refueling was uneventful as was the enroute trek to the entry point of the low level route. Any crew member who hadn't nibbled on his inflight lunch by now would not have the opportunity to touch it during the remaining three and a half hours of the flight.

The crew was introduced to their next malfunction during the Terrain Avoidance System Compensation run. All modes of the TA system were giving the pilots both deceiving and erroneous information. After exhausting all possibilities to correct the system while in flight, the decision was made to fly EVS/Visual contours through the route. The weather was VFR and the radar altimeter was functioning properly. Thank goodness for small favors.

During the last turn prior to the bomb run, the copilot noticed the oil pressure in the number three engine drop to 15 PSI and the low oil pressure warning light illuminate. The pilot reacted by accomplishing the bold print for emergency engine shutdown. The crew was notified that the situation was under control and the defensive team immediately opened their Dash I to further research the problem and lend technical assistance to the pilot team. Flying at 350 kts and 750 feet AGL through a popular bird migration path is no place for a pilot to be reading books of any kind.

Shortly after commencing the bomb run, the navigation team noticed the aircraft was insidiously developing heading problems. This was followed by a complete failure of the radar scope and associated equipment. The SRAM had previously been written up as being inoperative. The crew visually navigated to the end of the route and accomplished all planned releases on target.

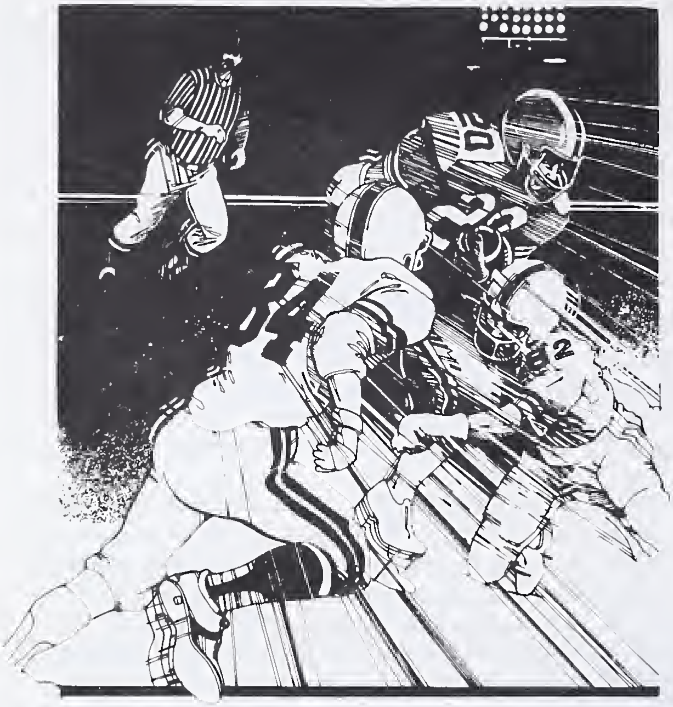
With clearance from ARTCC, the aircraft and crew were now on a direct route to the home base. Their advisory to center concerning the degraded navigation equipment included that both the radar and SRAM were inoperative, the HSI's at both pilot stations were intermittently rotating and fluctuating erratically, and to top it all off, the stand-by "whiskey" compass was unreliable since it was due an inflight compass swing. The copilot appended this laundry list of problems with the simple statement: ". . . but there is a road we've got in sight that will take us to Fargo!" Fargo was the next point on the flight plan.

At this point, navigation was based on visual reference with the ground. The navigation team worked furiously to restore partial navigational aids which allowed the crew to penetrate a line of weather which always seems to enshroud K. I. Sawyer AFB. There wasn't a moment when the crew wasn't working together to safely return the aircraft to its parking stub. With a sigh of relief and the satisfaction of a job well done, the crew was ready to assume alert later that week.

The coordinated effort of crew E-34 allowed them to accomplish valuable training even when plagued with an aircraft riddled with a multitude of system malfunctions. Only a thorough knowledge of aircraft systems allowed the crew to work around the problems.

Given a "routine" sortie, compounded with a few aircraft systems malfunctions, mission changes, or even battle damage, the only way the crew can come out ahead is through teamwork. Dedication to excellence and sound professionalism are the standard that all SAC crews strive to achieve—after that, everything else falls into place.

About the author. Capt Deckers earned his pilot wings at Laughlin AFB. He was an outstanding graduate from B-52 CCTS and serves currently as an aircraft commander at K. I. Sawyer AFB. Capt Deckers has more than 1200 flying hours.



Score With Safety

Lt Col Poling
Randolph AFB

I recently called one of our base safety offices to check on the status of one of their young airmen who had been involved in a serious auto accident. An even younger airman than the one who had been involved in the accident answered the phone. After responding in the negative to my queries of "Can I speak to so and so?. . .Well how about. . ." The young airman finally blurted: "Sir, all of the important people are gone. . ."

"All of the important people are gone. . ."

The 1985 Heisman Trophy winner was a running back from Auburn University named Bo Jackson. After fierce rounds of bidding between the NFL team that drafted Bo (Tampa Bay) and the baseball team that also drafted him (Kansas City), Bo chose to sign with the baseball team. I don't know why Bo Jackson chose baseball over football. . .maybe it was the money. . .maybe the Kansas City Royals offered him 71 wheelbarrows full of dollar bills and Tampa Bay only offered him 70 wheelbarrows full. Or maybe it was because the Royals made him feel more important. Well, I guess his reasons for signing with one team versus signing with the other really aren't that important, are they? That surely has nothing to do with our young airman—and surely nothing to do with safety.

Then again. . .

Bo Jackson knew he was important to the Royals. His bank statement told him so. But how about our airman? Is he not important? Who or what tells him so? It sure ain't the bank statement.

I've been in this safety business for three years now. In those three years ATC lost 57 important people to ground mishaps. . .that was down from 88 important people lost in the three years prior to that. Why was the number of deaths to our important people down by over 35%? Was it luck?

From 1984-1986, SAC lost 100 airmen. This represented a reduction of 27% when compared to the previous three years when 137 lives were lost (1983 -52, 1982 - 40, and 1981 - 45 fatalities).—Ed.

No, it was not luck. Uncle Sam spent megabucks on recruiting you, more megabucks on training you and still more megabucks on providing you life saving equipment. We encouraged you to wear lifebelts (honest, General Motors doesn't give us one penny in kickback money for increased lifebelt sales). We encouraged you to use your motorcycle helmet (no kickback there either). Same goes for safety goggles, hard toed shoes. . .and lastly, we encouraged you not to speed, and to exercise responsibility when it comes to alcohol and driving.

I think I shocked the young airman when I said "Airman, all of the important people aren't gone, for I'm talking to a very important person." I told him the data I needed and asked him to get it and call me back. Of course he did. Of course the information he provided was correct. . .and it was important.

Maybe I should have added "Please buckle up. . .please wear your helmet. . .please don't speed. . .please don't drive drunk." Then again, maybe he'll read this article and say to himself "Hey, the Air Force really does think I'm important!" And he'd be right. The Air Force really does think you're important.

And by the way, the young airman that was involved in the serious auto accident? He had been wearing his lifebelt. He lived. He had protected himself—maybe he realized how important he was.

From ATC's Approach To Safety—Ed.

THE CUTTING EDGE

Why the T.O.? Why Not Use. . .?

Maj James L. Robinson
3901 SMES, Vandenberg

One day after several minutes of ever increasing frustration while working with his new VCR, Fred said, "Ethel, where's the instructions for this machine? I can't seem to set it up for delayed recording." Ethel replied, "It's in the folder with the other instructions for all the stuff we've got."

As Fred reached for the folder, it dropped to the floor and out fell dozens of pamphlets of all shapes and sizes. As he sorted through the jumbled mess, Fred noted how each was written in a different style. He also found some with the information translated into several different languages. After he finally located the right book, he grumbled to himself, "Why didn't someone set some standards for these instructions? The least they could have done was put them on the same size paper."

It seems that everything in the home today needs some type of operating instructions. Everything from home computers to blenders comes with a pamphlet dictating everything from normal operation to maintenance and troubleshooting procedures (First step: "Is it plugged in?") Could you imagine operating the equipment of a missile launch control center that way? That is, each piece of equipment coming with a plastic envelope containing the instructions stating, "Read thoroughly before operating." Pretty farfetched, but only because the Air Force has standards for developing and maintaining equipment operating instructions.

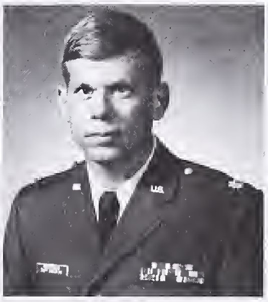
AFR 8-2, Air Force Technical Order System, states: "The Air Force T.O. system is the only official medium for disseminating technical information, instruction, maintenance, production, or modification of Air Force equipment and materials." This system ensures a standardized method of development and distribution for the instructions needed to operate our critical missile equipment. The system also allows for a method to incorporate changes as they are needed, be they routine, urgent, or emergency. The regulation further states that all T.O. data acquired must be according to military specifications.

What kind of specifications?

Among other things, the military specifications dictate style, format, and layout of technical orders. MIL-M-38311A describes the general layout of the ICBM operations technical orders. This document details the content of each section, describes the types of illustrations to be used and also requires the picture of the weapon system (". . .either in flight or standby environmental configuration") to be on the title page. Other military specifications dictate the procedures for development of the T.O. to include contractor validation and Air Force verification of the information prior to distribution.

The Air Staff (HQ USAF/LEYE) approves all the military specifications and standards related to the T.O. system. After approval, no deviations are authorized without advance, written authorization. These stringent requirements are the reasons we don't have books of different sizes or styles. The entire T.O. process ensures all the procedures crews will be using are safe, practical, and easily understood. T.O.s are designed to provide the best possible operating instructions under most circumstances, but cannot be used without thorough training and, most importantly, sound judgment. Generally, T.O.s are written for permissible operations—they tell you what you can do; not what you can't. So the crew member who says, "Well, the book doesn't say I can't do that," had better think twice before acting. (The key here is THINK!) The T.O. system is also the only recognized way to incorporate changes to the weapon system.

It is often easy to forget about the T.O. when new equipment or modifications are being developed. This is especially true when those responsible are not well versed in the T.O. system. It is critically important that our operating instructions accurately reflect the operational environment. To that end, anyone contemplating a modification or enhancement of the weapon system must keep the T.O. in mind and submit the needed changes through the one official medium we have — the Air Force T.O. system. Otherwise, like Fred, we could have books of all shapes and sizes—some even translated into foreign languages. . . Now where did I put those VCR instructions?



About the author. Maj James L. Robinson is currently assigned to the 3901 SMES as Chief, ICBM Operations Evaluation Team. His previous missile assignment was with the 321 SMW as the Senior Standardization Evaluation Missile Combat Crew Commander.

Are You Mentally Prepared?

1Lt Mark West
351 SMW, Whiteman AFB

"Darn, I'm sure getting frustrated with everything that's going on, sir," said the missile crew deputy after Global Shield 86 ended. His commander replied, "Why not check into taking a few days leave to relax?" "Well," replied the deputy, "I don't need to take any leave, it's just that things are moving too fast right now."

How many times has this scene been repeated by your crew? Fatigue, pressure, and stress have a habit of building up and finally releasing during times or situations when a mistake could be fatal, such as while driving. This same stress could contribute to mishaps or injuries while performing crucial maintenance or operations activities that leave no room for error. Like it or not, stress and fatigue are major factors in the way humans react to what is going on around them. How can everyone, especially those in high stress career fields, deal with overcoming stress, fatigue, and pressure?

One built-in safeguard designed to help alleviate stress buildup is leave. It may seem obvious, but leave is designed to give a break in routine to allow people to relax and release tension, thus leading to a more healthy person and a safer working environment. Many people avoid taking leave so that they can "save it up for a rainy day." While it is a good practice to have some leave time for an occasional emergency, not taking leave could prove to have disastrous consequences if an important task or checklist is forgotten because the individual was too tired or distracted to follow technical data. For people in high stress jobs, taking leave tends to enhance decision-making and job performance capabilities, helping ensure less possibility of a mishap. If you tend to fall into a rut after a few months, take some time off. You will be amazed at how your attitude and performance improve.

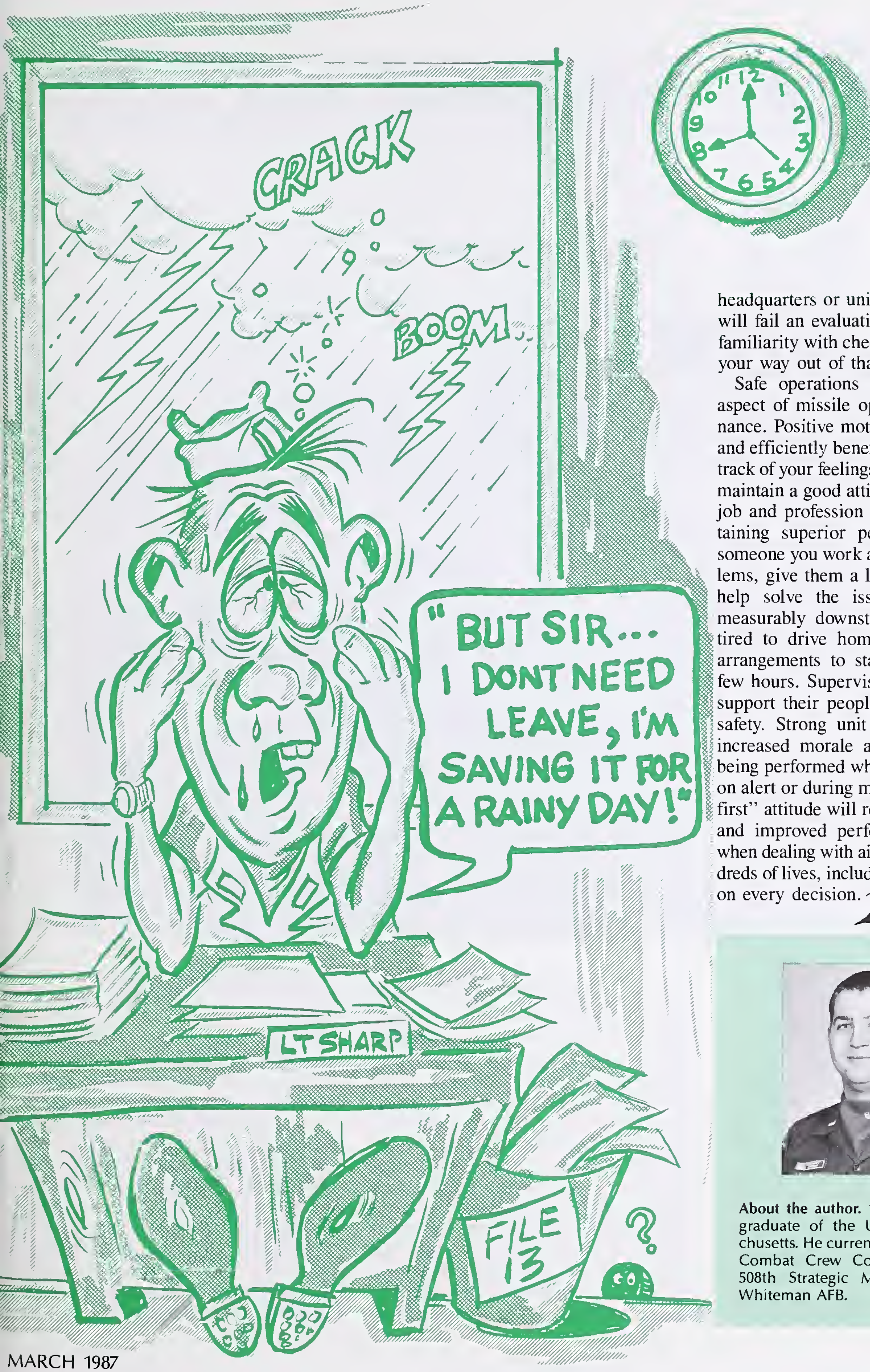
> **"If you tend to fall into a rut after a few months, take some time off. You will be amazed at how your attitude and performance improve."**

There are other ways to improve performance and reduce the risk of an accident caused by fatigue or stress. Regular exercise can increase your energy level and keep you more mentally alert. Combined with a good diet, it can also help keep the excess pounds off. Reading a challenging book or engaging in stimulating conversation is also a good way to keep the mind from dulling, and provides a catalyst for new ideas and a more pleasant atmosphere to work in. Early morning dialogue between crew members helps foster better crew coordination and can set a pleasant tone for the rest of the alert, thereby reducing tension and lessening the possibility of a mishap.

Attitude is another variable affecting performance. Crew members who understand the importance of their jobs and take pride in their military profession will probably have better morale, leading to strong performance and a desire to "do things right." Honest, open communication between squadron leadership and crew members helps reduce stress levels and improves the working environment. Everyone involved in the deterrence process, so important to this nation, needs to realize the importance of his or her role in maintaining the security of the country. Those who feel their job is worthless certainly are not going to try as hard as those who know the importance of their role in the "big picture." For people in leadership roles, this means getting out and discovering what all the personnel in your unit do and how they interact with other organizations. Getting out into areas not normally visited can give a new perspective on what keeps each wing's mission on course, while giving each person the feeling that his/her job really is as important as they are told it is.

A crucial factor in reducing stress and maintaining crew proficiency is open and professional communication between crew members. Spending 24 hours together requires a high level of trust and communication between commander and deputy. Neither individual should hesitate to approach the other to solve a problem—after all, you're not two individuals in opposition, but a CREW that works to maintain the strategic deterrence of the United States.

How can supervisors enhance safety and at the same time provide a positive atmosphere in which to work? Safety knowledge is worthless unless it is believed and practiced by all personnel at the wing, from the wing commander to the newest airman. Convincing people of the importance of safe operations is difficult when a flippant attitude prevails concerning use of technical data, field procedures, and proper driving habits. A crew commander who speeds while driving back to base from alert influences the way his subordinates perceive his acceptance of responsibility and maturity level. Similarly, a commander who teaches a newly acquired deputy all the "shortcuts" not only hurts himself, but impairs the potential of his crew partner. The time will come when, in a higher


CRACK
BOOM
"BUT SIR... I DONT NEED LEAVE, I'M SAVING IT FOR A RAINY DAY!"
LT SHARP
FILE 13

headquarters or unit inspection, the crew will fail an evaluation because of lack of familiarity with checklists. Try explaining your way out of that one.

Safe operations are a must in every aspect of missile operations and maintenance. Positive motivation to work safely and efficiently benefits everyone. Keeping track of your feelings and ensuring that you maintain a good attitude toward both your job and profession is important in maintaining superior performance levels. If someone you work around is having problems, give them a little extra attention to help solve the issue—it will pay immeasurably downstream. If you are too tired to drive home from a site, make arrangements to stay over to rest for a few hours. Supervisors must ensure they support their people on issues regarding safety. Strong unit support will lead to increased morale and better procedures being performed where it really counts — on alert or during maintenance. A "safety first" attitude will result in fewer mishaps and improved performance. Remember, when dealing with aircraft or missiles, hundreds of lives, including your own, can rest on every decision.

About the author. 1Lt West is an ROTC graduate of the University of Massachusetts. He currently serves as a Missile Combat Crew Commander with the 508th Strategic Missile Squadron at Whiteman AFB.

Flying Crew

A crew of the 171st Air Refueling Wing (ANG), Greater Pittsburgh IAP, is SAC's Flying Crew of the Month. Commanded by Maj David B. Oguss, the rest of the crew consists of 1Lt Michael L. Carls, CP; Capt Richard A. Johnson, N; Lt Col Gary M. Shannon, IN; and SMSgt Charles "Pete" Zimmerman, BO. Recently the crew flew a KC-135E sortie out of Keflavik, Iceland. Upon landing back at Keflavik, the aircraft's crew chiefs, TSgt George Nicklas, TSgt Robert Roberts and A1C Susan Stokes, immediately began to prepare for the following day's mission by uploading 95,000 pounds of fuel. At 1255L the Iceland SAC operations officer received a phone call requesting emergency refueling support for a flight of five F-16 aircraft being escorted by a single KC-135A (Red 22) to Europe. A second KC-135A had aborted due to a major fuel leak. The Pittsburgh crew responded and conducted a rapid through-flight inspection. With each crew member accomplishing his responsibilities as rapidly as possible, the aircraft, with crew and crew chiefs onboard was airborne at 1320L, 25 minutes after initial notification. After departure, Maj Oguss handled flying the aircraft while 1Lt Carls coordinated the required clearance and a rendezvous point over the mid-Atlantic. While the Pittsburgh crew proceeded at top speed towards the rendezvous, Red 22 provided a final token offload to each of the receivers. The 171st crew arrived in minimum time and once the rendezvous was complete, SMSgt Zimmerman went to work, expertly handling his boom operator duties and cycling each F-16 onto the boom for a quick 2000 pound offload. SMSgt Zimmerman directed each receiver back onto the boom for an additional 5000 pounds of fuel allowing all aircraft to reach their destinations safely. The superb efforts of Maj Oguss, his flight crew and crew chiefs contributed to the safe and successful completion of a complicated mission and epitomize the professional abilities and attributes of SAC aircrews.

Missile Crew

The 341 SMW Crew R-132, 1Lt Jeffrey K. Lowe, MCCC, and 2Lt Marvin C. Boswell, DMCCC, is SAC's Missile Crew of the Month.

While on alert recently at launch control centers (LCCs) Echo-Zero and November-Zero Crew R-132 demonstrated outstanding weapon system knowledge as well as the highest degree of professionalism. Due to an equipment malfunction at an adjacent LCC, Crew R-132 became responsible for all target constants generation and remote data change actions. These procedures were required to return squadron remote launch facilities (LFs) to a launch capable status following the annual code change. Their expertise in these new procedures ensured the correct reposturing of a significant portion of the SAC deterrent force. During the same month, upon receiving indications of a security violation at one of their remote LFs, the crew promptly dispatched an Alarm Response Team (ART) to investigate. The ART vehicle, enroute to the LF, was forced off the road by a civilian vehicle. Upon hearing of the accident, Crew R-132 referenced their contingency checklist. They immediately relayed all pertinent information to wing command post and dispatched security personnel from their launch control facility as well as directing assistance from other security personnel in their squadron. Crew R-132's quick and decisive actions ensured not only security was maintained at their remote LF, but also that the injured personnel were promptly transported to a hospital for medical treatment in minimum time.

Aircraft Maintenance

SSgt Michael T. Thomas, 6 SW, Eielson AFB, is SAC's Maintenance Airman of the Month. His selection is based on his superior technical knowledge, training abilities, supervisory and leadership qualities, and overall support of the radio communications shop. Responsible for numerous sophisticated communications systems aboard the aircraft that support nationally vital missions, he has contributed his utmost to ensure effective, high quality maintenance.

Sgt Thomas has been the mainstay on ARC-190 HF equipment and critical Air Force Satellite Communications (AFSATCOM) systems. Recently, a shortage of circuit cards used to repair ARC-190 HF transceivers was impacting the shop's ability to provide serviceable units for KC-135 aircraft. Through technical order research, he discovered alignment procedures normally accomplished at the depot which could be performed at field level. Now, numerous units once sent to the depot for repair are being repaired in the field. This resulted in an increase of transceivers in the supply inventory and a savings for the Air Force of thousands of dollars in shipping and maintenance costs.

Munitions Maintenance

SSgt Joseph A. Lynam, 28 BMW, Ellsworth AFB, is SAC's Munitions Airman of the Month. Currently assigned as NCOIC of the squadron's nuclear ordnance commodity management section, Sgt Lynam has performed all assigned duties in a completely unselfish manner with total dedication and devotion. Utilizing superior technical knowledge, he greatly enhanced the accountability and availability of munition assets necessary to accomplish the wing's mission.

During a six-month period recently, Sgt Lynam spearheaded 39 Special Asset Airlift Missions (SAAM). He coordinated with all operational areas of the 28 MMS and assured error free documentation was available for each SAAM. Without fail, Sgt Lynam volunteered numerous off-duty hours in support of these missions. As a direct result of his superb performance, the 28 BMW received the Nuclear Surety Certificate of Appreciation from the Air Force Directorate of Nuclear Surety. Additionally, Ellsworth AFB was recognized in the Jul-Aug 86 edition of the Air Force Nuclear Safety Journal for outstanding support.

DeHAVILLAND 4-B

Project Warrior

5TH BOMBARDMENT WING

Guardians of the Upper Realm

Capt Edward J. Jaeger
MSgt Jack Billups
5th BMW, Minot AFB

The history of the 5th Bombardment Wing dates back nearly seven decades to the infancy of military aviation and contains a chronology of the development of the United States as a strategic air power.

Officially activated as the 2nd Group (Observation) on 15 August 1919 at Luke Field, Territory of Hawaii, the unit holds the distinct honor of being the oldest wing in Fifteenth Air Force and second oldest in all of the Strategic Air Command.

During its first 20 years, the unit's name changed several times before it emerged as the 5th Bombardment Group on 9 March 1938. Throughout that period, the Group conducted bombing, navigation, and gunnery training while also participating in various missions for the Territorial Forestry Service, assisted in charting the islands, and conducted Army/Navy maneuvers. The culmination of these efforts was one of true humanitarian sentiment. In 1935, the 13,677 foot Mauna Loa volcano on the island of Hawaii erupted. The resulting lava flows were threatening the city of Hilo along with its water supply. In response to a request from Dr. Thomas A. Jaggar, Director of the Hawaiian Volcano Observatory, the U.S. Army Air Corps agreed to a plan to drop 20 600-pound bombs in an effort to divert the advancing lava. On 26-27 December, a flight of 10 fabric-covered Keystone B-3 and B-4 bombers flown by crews from the Group's 23rd and 72nd Bombardment Squadrons were successful in diverting the lava and thereby saved the city from catastrophe.

In 1939, after 20 years at Luke Field, the unit moved to Hickam Field, Territory of Hawaii. This move placed the group in a vulnerable position during the surprise Japanese attack of Pearl Harbor on 7 December 1941. As a result of that attack, 21 men were lost, several aircraft were destroyed, and numerous other injuries and damage to most of the remaining aircraft occurred. Despite these losses, Major L. G. Saunders and Captain B. E. Allen were able to assemble crews to man remaining aircraft and took off in search of the aggressors.

In the next several months, the group flew numerous patrol missions. During one mission, a 394th Bombardment Squadron crew led by Lt A. W. Smith alerted the group that they had sighted an enemy convoy steaming towards Hawaii. Immediately, the group generated 14 B-17s. This began their involvement in the Battle of Midway. During the four day action, direct hits were scored on two enemy aircraft carriers, a battleship, a cruiser, and a destroyer. In addition, a transport vessel was sunk and a number of Japanese "Zero" fighters were shot down.

The group left Hawaii in November 1942. Operating from bases in the South and Southwest Pacific the unit served in combat with the Thirteenth Air Force, known as the "Jungle Air Force." During that long Allied drive across the Pacific, the group took every opportunity to strike at the enemy. This included flying long patrol and reconnaissance missions. They were also active in attacking Japanese shipping off Guadalcanal, and raiding airfields and enemy installations on Bougainville, New Britain, New Ireland, the Woleai Islands, Yap, and Truk. Never succumbing to heavy flak or extensive fighter defenses, the 5th went on to destroy the "Ploesti of the Pacific," the oil refineries at Balikpapan, Borneo. At the conclusion of the war the group was operating out of the Philippine Islands. During the nearly four years of bloody battle, the group participated in 10 major campaigns, flew over 1,000 combat missions, earned two Distinguished Unit Citations and the Philippine Presidential Unit Citation. In doing so, its members had accumulated over 13,300 decorations.

The group remained in the Pacific theater after the war and was redesignated as the 5th Reconnaissance Group in February 1947, utilizing FB-17 and F-2 aircraft to map areas of the Philippines, Formosa, and the Pescodores Islands.

In May 1949, the group finally moved to U.S. soil at Mountain Home AFB, Idaho, and was assigned to the Strategic Air Command. Within two months it was redesignated as the 5th Strategic Reconnaissance Wing and was equipped with RB-29s before moving to Fairfield-Suisun AFB, California, later renamed Travis AFB.

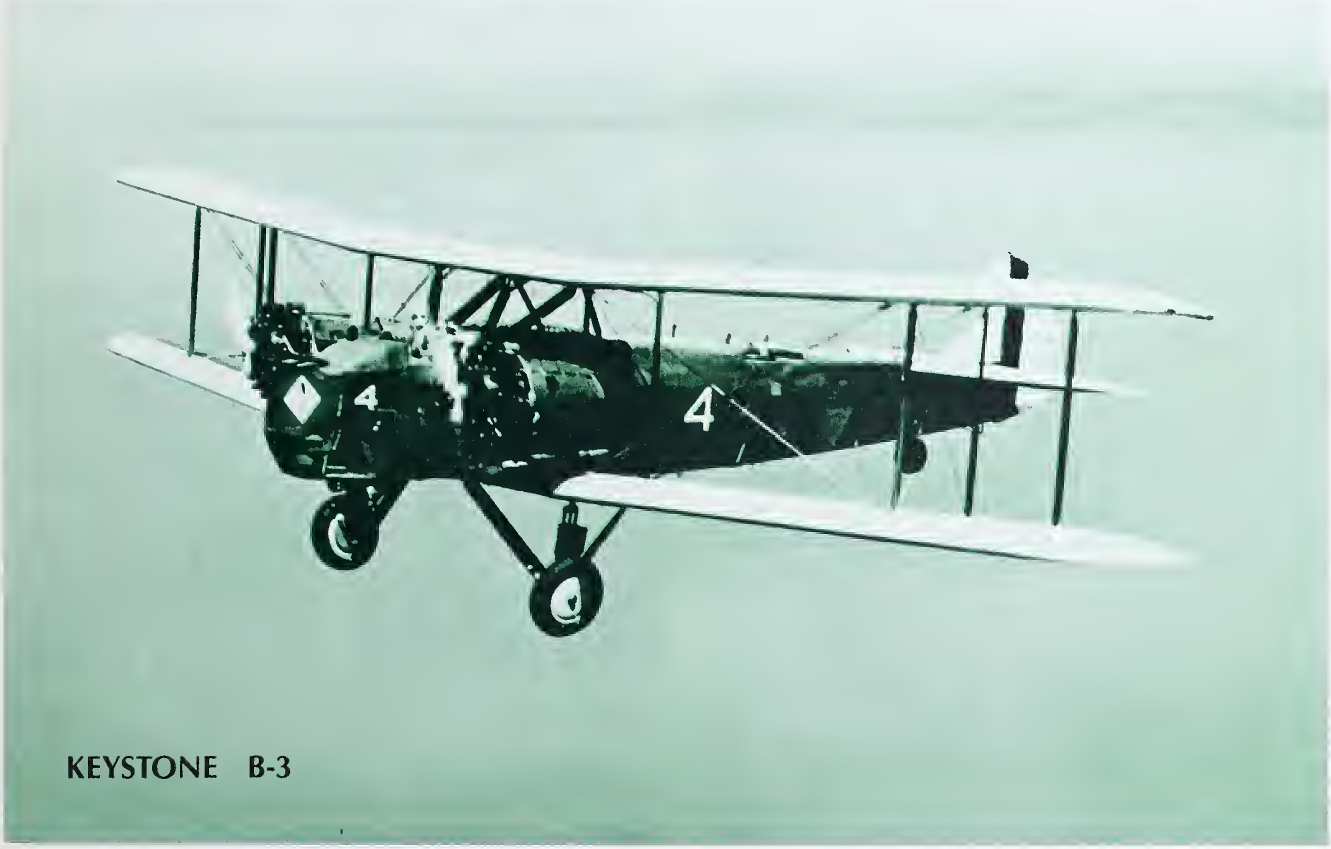
During its first 15 months in California, the wing was fully integrated with the 9th Strategic Reconnaissance Wing and began converting from RB-29 to B/RB-36 aircraft. However, the Korean Conflict developed and the wing deployed four aircraft to the Far East for reconnaissance duty. In October 1955, the unit was redesignated as the 5th Bombardment Wing (Heavy).

In 1958, the unit was split into three separate wings, with one remaining at Travis and the other two stationed at Mather and Beale AFBs, California. The division occurred as scheduled and the 5th received its first B-52G aircraft on 13 February 1959. With this addition the wing also gained the 916th Air refueling Squadron and the KC-135A aircraft.

Throughout the early 1960s, the wing experienced only minor changes in operations; however, in November 1964, the Air Force Chief of Staff directed SAC to move the 5th without personnel or equipment from Travis to Minot AFB, North Dakota, where it would assume control of the assets of the discontinued 450th Bombardment Wing.

After 18 years at Travis, the wing moved to Minot on 25 July 1968, where it has utilized the B-52H and KC-135A to serve in the defense of America.

The Keystone B-3, first of the "B" category bombers. The B-3 had a 74-foot 8-inch wingspan and a gross weight of more than 12,950 pounds. It was powered by two 525 horsepower, air-cooled radial engines and required a five-man crew.



KEYSTONE B-3

During WWII's Battle of Midway, the 5th Bombardment Group's B-17s scored direct hits on two enemy aircraft carriers, a battleship, a cruiser, and a destroyer. In addition, a transport vessel was sunk and a number of Japanese fighters were shot down.

As the conflict in Southeast Asia intensified, crews from the operations community began rotational duty participating in operations "Arc Light," "Young Tiger," and "Linebacker" in support of American ground forces.

As the decade of the 70's slipped past, the unit continued its outstanding service to the nation and filled its trophy case with individual, crew, maintenance, operations, and wing awards.

When the need to demonstrate America's ability to project conventional strength worldwide surfaced, the United States Central Command (USCENTCOM) and United States Central Air Forces (USCENTAF) were formed. As a spearhead unit, the wing has been called upon to participate in numerous exercises including flyovers and actual deployments to Egypt plus CONUS deployments to Texas and Florida.

The 1980s have been packed with outstanding accomplishments. The wing's maintenance complex was named "Best in SAC" for 1980. The following year it took runner-up for the prestigious Daedalian Award signifying one of the best maintenance complexes in the Air Force. In 1982 the 906th Air Refueling Squadron brought home the Albert L. Evans Memorial Air Refueling Trophy while the 23rd Bombardment Squadron captured the Best B-52 Crew Award and Crumm Trophy at the annual SAC Bombing and Navigation Competition. During 1983, the unit became the first Offensive Avionics System (OAS) modified B-52H wing and later that year Minot became host to the largest aircraft alert force in SAC. Not to be outdone, the tanker squadron captured the Best KC-135 Crew Award during the 1984 SAC Bombing and Navigation Competition and backed up their performance by winning both the Evans and General Carl A. Spaatz trophies.

Room in the wing's trophy case came at a premium during 1985. Due to sustained excellence, the tanker squadron again brought home the Spaatz, the bomber squadron won the General John D. Ryan Trophy and the wing captured numerous Fifteenth Air Force awards including the Riverside, plus the prestigious Charles D. Trail Logistics Award and the highly coveted Omaha Trophy denoting the "Best Wing in SAC." In September, the wing's team at the SAC Combat Weapons Loading Competition virtually swept the event capturing almost every trophy including the prestigious Barrentine Trophy and placed high in several categories during the SAC Bombing and Navigation Competition.

Excellence, by definition, is the state of surpassing others or being superior, but in everyday practice, excellence is the standard of the "Guardians of the Upper Realm."

About the authors. Capt Jaeger is a 1981 graduate of the Florida Institute of Technology and serves as an instructor electronic warfare officer in the 23 BMS. MSgt Billups serves as the wing historian of the 5th BMW. He was previously wing historian of the 320 BMW at Mather AFB.

SAC SAFETY SCREEN

The SAC Safety Screen is an honor roll of SAC's most professional crews. To gain listing on the Screen, crew members must be nominated by their unit commanders and meet high selection criteria of experience in their aircraft or missile system *IAW AFR 127-2/SS1*.

321 SMW, Grand Forks Crew R-101: MCCC 1Lt Edwin T Parks, DMCCC 2Lt Phillip G Rockwell

307 AREFS, K I Sawyer Crew E-161: FP Capt Leo R Stubbs, CP 2Lt David B Royal, IN 1Lt Daniel D Meyer, BO A1C John C Smith

644 BMS, K I Sawyer Crew E-44: FP Maj Steven C Nunn, CP Capt Steven M Tigner, RN Capt Kevin A McAlee, NN 1Lt Anthony D Phillips, EW 1Lt Scott P Nickerson, AG A1C Peter J Girtz

5 BMW, Minot Crew S-104: P Maj Thomas G Halseth, CP 1Lt Gus L Serra, IN Maj Waldemar Kowitz, IBO SSgt Todd L Pryby

5 BMW, Minot Crew R-117: P Capt Colleen Dugan, CP 1Lt Wayne E Howe, N 1 Lt Paul J Downs, BO AIC Christopher T Sloan

5 BMW, Minot Crew R-122: IP Capt Annabel S Sparkman, CP Capt Ronald E Hansen, N 1Lt Vic E Kleiser, BO A1C Carol L Sharp

23 BMS, Minot Crew E-43: P Maj Ronald Herre, CP Capt Jeffery Cepuran, RN Capt Russell Barnes, N Capt Kenneth Hlavacek, EWO 1Lt Robin Soule, G SSgt Christopher Austin

23 BMS, Minot Crew E-45: P Maj David Giegler, CP 1Lt Kirk Fansher, RN Maj Fred Swann, N Capt Daniel Clevenger, EWO 1Lt Robert Vomela, G Sgt Paul Collier

905 AREFS, Grand Forks Crew F-134: P Capt Dana M Stabin, CP 2Lt James A Obester Jr, N 1Lt Kenneth J Bryant, IBO SSgt Theodore N Johnson

905 AREFS, Grand Forks Crew R-115: P Capt Mark A Volk, CP 1Lt William K Fetzner, N 1Lt Timothy A Green, BO A1C Tony S Ceraolo

905 AREFS, Grand Forks Crew S-103: IP Capt Michael A Hawkins, CP Stephen W Skinner, IN Capt Jeffery A Nash, IBO SSgt James W Hackworth

43 AREFS, Fairchild Crew R-113: P Capt Jose Sanches, CP 1Lt Christopher P Wittman, N 1Lt Jeremy J Aikins, B SSgt Robert D Grovhoug

43 AREFS, Fairchild Crew R-124: P Capt Wayne C Eastham, CP 1Lt Frank P Perrino, N 1Lt William V Cobern, B SSgt Allan R Wesemann

912 AREFS, Robins Crew E-123: FP Capt Richard L Flerra, CP 1Lt George S Calhoun, NN Capt Thomas E Timmons, BO Sgt Colon K Miller

60 BMS, Andersen Crew E-14: AC Capt Russell B Bridgham, CP 2Lt Michael S Dershem, RN Capt Alton L Berger, N 1Lt Manuel Gomes, EW Capt Gregory G Sprang, AG SSgt Ray M Eddy

60 BMS, Andersen Crew R-34: AC Capt Roger N Anderson Jr, CP 1Lt David A Schiffer, RN Capt Philip J Vogel, N 1Lt Daniel C Crawford, EW 1Lt Danilo M Pimentel, AG SSgt Shawn M Daugherty

97 AREFS, Blytheville Crew R-112: AC Capt Willard E Shaw, CP 1Lt Forrest M Hobbs, N 1Lt Douglas A Robbins, BO TSgt Anthony W Britt

97 AREFS, Blytheville Crew E-122: AC Capt Lawrence J Hoffman, CP 1Lt Mark W Warnick, N 1Lt William D Cobb, BO A1C Michael A Northup

344 AREFS, Seymour Johnson Crew S-105: P Lt Col Dennis Ryan, CP Capt Mark Chenier, FE MSgt Benny Rice, BO CMSgt Thomas Glenister

344 AREFS, Seymour Johnson Crew E-121: P Capt Jeff Jackson, CP Capt Bill Villafranca, FE SSgt Robert Minor, BO TSgt Julius Howell

911 AREFS, Seymour Johnson Crew E-021: P Capt Jeffery R Glass, CP Capt David O Norton, FE Tsgt Richard F Gelvin, BO SSgt Rand M Sanders

911 AREFS, Seymour Johnson Crew E-030: P Capt James V Cerulli, CP Capt Paul E Bunt, FE TSgt Winfield Scott, BO SSgt Larry J Roberts

17 RW, RAF Alconbury AB, UK: Capt Ken Schopper, Crew E-48, Capt Craig Gardner, Crew E-26

99 AREFS, Robins Crew E-180: FP Capt Richard A May, CP 1Lt Theodore R Lemieux, NN 1Lt Karen E Hudson, BO SSgt Michael G Brannan

305 AREFW, Grissom Crew R-190P: AC Capt Michael Frye, CP 2Lt Richard Gertz, N 1Lt William Overbey, BO Sgt John Weber

351 SMW, Whiteman Crew E-174: MCCC Capt Charles W Crain, DMCCC 1Lt James C Powell

90 SMW, F E Warren Crew R-184: MCCC Capt Michael P Creegan, DMCCC 2Lt Alfred G Helm

44 SMW, Ellsworth Crew E-084: MCCC 1Lt Timothy Nesmith, DMCCC 2Lt Brian J Butterworth

44 SMW, Ellsworth Crew R-090: MCCC 1Lt Kevin B Driscoll, DMCCC 2Lt Allan W Horbach

UNIVERSITY OF FLORIDA
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THE 10 COMMANDMENTS
OF GOOD CREW COORDINATION

FLARE

I Aircraft Commanders

Think People!
Remember you are working with people who have feelings of worth, need and dignity.

II Aircraft Commanders

Set The Tone!
If you're the director of a one-man band, you won't foster much crew coordination. You, the pilot, set the tone of the crew. If you encourage and are receptive to an exchange of information, you'll probably get it. Also, let each crew member know what you expect of him.

III Aircraft Commanders

Solicit Information!
Ask for opinions or suggestions. It's not a sign of command weakness to ask what the other crew members think.

IV Aircraft Commanders

Use Other Crew Members' Experience!
That old boom operator probably has a lot of experience which can help you. Use it.

V Crew Members

Don't Be Shy!
If you've got something bothering you, speak up. You may know something that someone doesn't know.

VI Crew Members

Be Persistent!
Keep the pilot and other crew members informed. Don't let one crew member snuff you out.

VII Crew Members

Remember Who's In Command!
Make your input to the boss but remember he makes the final decision.

VIII Aircraft Commanders and Crew Members

Be Tactful!
Don't close the channels of communication in crew coordination through immature or unprofessional behavior.

IX Aircraft Commanders and Crew Members

Reinforce Good Coordination!
When your crew flies a successful mission, it involves a lot of successful efforts by your crew and other support people. Reward people for special efforts with a thank you or a letter to their commander. Remember, a small "thank you" goes a long way with the other crew members and team players.

X Aircraft Commanders

Don't Shirk Your Responsibility!
Think people; set the tone for crew coordination; solicit information; use experienced people; reinforce good coordination; BUT, remember you must make the final decision and be responsible for it.